

CLAIMS

WHAT IS CLAIMED IS:

1. A fuel fill system comprising:
a funnel having an inlet port configured to receive a nozzle from an external fuel source;
5 a fuel filler tube coupled to an outlet port of the funnel; and
a vapor recirculation tube coupled to the funnel, wherein fuel vapor from the vapor recirculation tube enters the funnel through a fuel vapor port, and the fuel vapor port directs the fuel vapor toward the outlet port.
- 10 2. The fuel fill system of claim 1, wherein the funnel includes a cylindrical portion through which the fuel vapor port is disposed, the fuel vapor port has a centerline disposed at a first angle less than 90° from a longitudinal axis of the cylindrical portion.
3. The fuel fill system of claim 2, wherein the first angle is between about 20° to
15 about 70° .
4. The fuel fill system of claim 3, wherein the first angle is between about 30° to about 60° .
- 20 5. The fuel fill system of claim 1, wherein, in a plane perpendicular to a longitudinal axis of the funnel, the fuel vapor port further directs the fuel vapor at a second angle less than 90° from a line tangent to an inner surface of the funnel at a point where fuel vapor enters the funnel.
- 25 6. The fuel fill system of claim 5, wherein the fuel vapor port has a centerline disposed at the second angle.
7. The fuel fill system of claim 5, wherein the second angle is between about 20° to about 70° .

30

8. The fuel fill system of claim 7, wherein the second angle is between about 30° to about 60°.

9. A fuel fill system comprising:
35 a funnel having an inlet port configured to receive a nozzle from an external fuel source;
a fuel filler tube coupled to an outlet port of the funnel; and
a vapor recirculation tube coupled to the funnel, wherein, in a plane perpendicular to a longitudinal axis of the funnel, the fuel vapor entering the funnel from the vapor recirculation
40 tube is directed at a first angle less than 90° from a line tangent to an inner surface of the funnel at a point where the fuel vapor enters the funnel.

10. The fuel fill system of claim 9, further comprising:
a fuel vapor port disposed through the funnel and in fluid communication with the
45 vapor recirculation tube, the fuel vapor port having a centerline disposed at the first angle.

11. The fuel fill system of claim 10, wherein the centerline of the fuel vapor port is further disposed at a second angle less than 90° from the longitudinal axis of the funnel to direct the fuel vapor toward the outlet port.
50

12. The fuel fill system of claim 11, wherein each of the first and second angles is between about 20° to about 70°.

13. The fuel fill system of claim 12, wherein each of the first and second angles is
55 between about 30° to about 60°.

14. A funnel for a fuel fill system, the funnel comprising:
an inlet port configured to receive a nozzle from an external fuel source;
an outlet port through which fuel from the nozzle passes to a fuel filler tube; and
60 a fuel vapor port configured to direct fuel vapor entering the funnel towards the outlet port.

15. The funnel of claim 14, wherein the fuel vapor port has a centerline disposed at a first angle less than 90° from a longitudinal axis of the funnel.

65

16. The funnel of claim 15, wherein the first angle is between about 20° to about 70°.

70

17. The funnel of claim 16, wherein the first angle is between about 30° to about 60°.

75

18. The funnel of claim 14, wherein the fuel vapor port is further configured to direct the fuel vapor entering the funnel at a second angle less than 90° from a line tangent to an inner surface of the funnel at a point where the fuel vapor enters the funnel, the angle being in a plane perpendicular to the longitudinal axis of the funnel.

19. The funnel of claim 18, wherein the second angle is between about 20° to about 70°.

80

20. The funnel of claim 19, wherein the second angle is between about 30° to about 60°.

85

21. A funnel for a fuel fill system, the funnel comprising:
an inlet port configured to receive a nozzle from an external fuel source;
an outlet port through which fuel from the nozzle passes to a fuel filler tube; and
a fuel vapor port configured to direct fuel vapor entering the funnel at a first angle less than 90° from a line tangent to an inner surface of the funnel at a point where the fuel vapor enters the funnel, the angle being in a plane perpendicular to a longitudinal axis of the funnel.

90

22. The funnel of claim 21, wherein the fuel vapor port has a centerline disposed at the first angle.

95

23. The funnel of claim 22, wherein the centerline of the fuel vapor port is further disposed at a second angle less than 90° from the longitudinal axis of the funnel to direct the fuel vapor entering the funnel toward the outlet port.

24. The funnel of claim 23, wherein each of the first and second angles is between about 20° to about 70°.

100 25. The funnel of claim 24, wherein each of the first and second angles is between
about 30° to about 60°.

105

110